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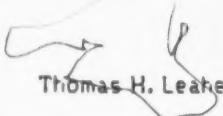
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ABSTRACT

Wilhelm Wundt provided a complete and concise description of his introspective method in a 1907 paper criticizing the thought experiments conducted by the Wurzburg psychologists. This major work is now being translated for the first time. For Wundt, the role of experimental method was to ensure the best conditions for observing and reporting conscious experiences, with the aim of gathering reliable results upon which a systematic science of consciousness could be erected. Wundt had four rules for correct introspective practice: (1) the introspective observer must be able to decide for himself at what point to begin observing the mental process under investigation; (2) the observer must be in a state of heightened attention; (3) each observation must be repeated again and again under the same conditions; and (4) circumstances under which the phenomenon occurs must be investigated by varying the accompanying experimental situations. Wundt's rules and practices for scientific introspection are related to contemporary debates in cognitive science over the nature and proper use of introspection. Current critiques of introspective methods for investigating thinking were anticipated by Wundt in 1907. (Author/ABL)

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Wundt on introspection: Reflection on current controversy


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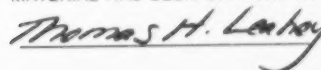
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WUNDT ON INTROSPECTION: REFLECTION ON CURRENT CONTROVERSY

Abstract

Wilhelm Wundt provided a complete and concise description of his introspective method in a 1907 paper criticizing the thought experiments conducted by the Wurzburg psychologists. This major work is now being translated for the first time. Wundt's method of introspection is described, and his method for investigating thinking is discussed. Wundt's rules and practices for scientific introspection are related to contemporary debates over the nature and proper use of introspection going on in cognitive science. It is shown that current critiques of introspective methods for investigating thinking were anticipated by Wundt in 1907.

WUNDT ON INTROSPECTION: REFLECTION ON CURRENT CONTROVERSY

Beginning in 1901, Oswald Kulpe and his followers began a famous series of experimental investigations of thinking. Their techniques and findings proved controversial, raising doubts among many psychologists, especially in the United States, about the very validity of introspection as a scientific method. The Wurzburg laboratory found that thinking was accompanied by imageless elements in consciousness, while other laboratories, notably E. B. Titchener's, failed to find imageless thoughts in careful replications of the Wurzburg experiments. Early behaviorists often cited the inability of mentalists to resolve the imageless thought controversy as a reason for abandoning introspection altogether in favor of behavioral methods.

What is little realized, however, is that the Wurzburgers' (and Titchener's) practice of introspection was quite different from that employed by Wilhelm Wundt in his laboratory. Consequently, when behavioral psychologists abandoned introspection in the 1920's the method they abandoned was not the one they thought they were abandoning. For in truth the Wurzburg methods were just those Wundt himself had rejected in his founding of experimental psychology. In a lengthy paper of 1907, Über Ausfrageexperimente und über die Methoden zur Psychologie des Denkens (Concerning interview-experiments and the methods for the psychology of thinking), Wundt analyzed and repudiated the methods used by the Wurzburg psychologists. In doing so he concisely described the correct methods of introspection and set forth his views on the nature of the cognitive processes and the correct way to investigate them. We are currently translating Wundt's paper, and this presentation is the first fruit of our efforts. Here, we briefly describe Wundt's strictures on introspective practice and his grounds for rejecting the Wurzburg methods, setting straight the historical record. Then, we show that in a way characteristic of modern psychology, contemporary arguments on the use of introspection in cognitive science rework the same themes as the imageless thought controversy 80 years ago.

THE IMAGELESS THOUGHT CONTROVERSY

The work of the Wurzburg School

The psychologists at Wurzburg, led by Wundt's former student Oswald Kulpe, undertook the experimental investigation of thinking -- which Wundt had long argued was not feasible -- with a simple -- Wundt would call it "terribly simple -- method. A problem was set to the subject, he answered it, and then proceeded to report retrospectively the conscious processes that had occurred as the answer came to mind. The difficulty of the set problems varied considerably from giving simple associations to answering questions such as "can the atomic theory be disconfirmed by some discovery?". Sometimes the latency to the initial response was measured, and sometimes subjects were supposed to pay attention to different stages in the emergence of the answer into consciousness, but basically the method remained the same in all the experiments. The Wurzburgers found, contrary to Wundt and to various philosophers going back to Aristotle, that the contents of consciousness could not be exhaustively analyzed into images. Their findings were essentially negative: they described their imageless thoughts in nebulous terms such as "the impalpable" and they groped for a positive characterization of their results.

As is well known, the Wurzburg findings engendered much controversy on both sides of the Atlantic. What we wish to focus on is the methodological paper, "Concerning interview-experiments and the methods for the psychology of thinking", that the Wurzburg

results moved Wundt to write. There are two brief accounts of this paper, in the first edition of Woodworth's Experimental psychology, and in Humphrey's little book on Thinking. We believe that the paper deserves more attention as a clear and forceful statement of Wundt's experimental practices and rules for the conduct of experiments, and that his paper may still shed light on the roles of consciousness and introspection in cognitive science today.

Wundt on introspection

Wundt was a mentalist. That is, like most introspective psychologists of his day, his goal was to explain human conscious experience as such. In the 1907 paper Wundt lists "the central problems of psychology" as "the questions" first, "the constitution of consciousness", second, "the relations between consciousness and attention", and, third "the relation of clearly conscious, apperceived experiences, to the more or less dimly conscious experiences." The role of experimental method was therefore to ensure the best conditions for observing and reporting conscious experiences, with the aim of gathering reliable results upon which a systematic science of consciousness could be erected. Wundt specifically rejected traditional philosophical, uncontrolled armchair reflection -- what he called "self-observation" -- in favor of carefully controlled, quantitatively oriented, well-defined experimental introspection -- what he called "inner perception."

In this paper, Wundt (1907) lists four rules, borrowed and modified from physics, for correct introspective practice:

- "1. To the fullest extent possible, the [introspective] observer must be able to decide for himself at what point to begin observing the [mental] process under investigation.
2. As far as possible, the observer must be in a state of heightened attention in order to apprehend the phenomena and follow their course.
3. In order the achieve the [scientific] goal of reliable results, each observation must be repeated again and again under the same conditions.
4. The circumstances under which the phenomenon occurs must be investigated by varying the accompanying [experimental] situations. In these additional and related experiments the situation must be systematically altered so that the conditions controlling the phenomenon are varied in quantity or quality, or are sometimes eliminated entirely."

Wundt of course recognized that not every experiment in psychology could meet all four criteria. Some could, and Wundt called these "perfect experiments", giving as an example exactly determining the quantitative degree of the Muller-Lyer illusion. Many more experiments, for example Ebbinghaus's memory experiments, were "imperfect experiments". In them, not all the rules could be met, but Wundt vehemently insisted that when conducting an experiment in which one rule is not met, it is imperative that the others be scrupulously adhered to. Finally, "pseudo-experiments" are experiments in which none of the rules are met, and which consequently have no scientific value whatsoever. Wundt placed the Wurzburg experiments in this category.

Wundt argued that although the thought experiments of Wurzburg looked like conventional "reaction-experiments", in which a stimulus is presented and a reaction called forth, in fact the practices of Kulpe and his associates at Wurzburg violated all the canons of correct method:

- (1) Since the observer has no idea what question will be asked, he cannot control the onset of the thought process and be prepared to observe it correctly;
- (2) It is impossible to think and at the same time detach oneself enough from the thinking to attentively observe it;

- (3) A given experiment cannot be replicated since asking the same question again would be a memory-experiment, not a thought experiment;
- (4) Similarly, the conditions of a given experiment cannot be systematically varied without using the same question and introducing memory factors.

Wundt concluded that the Wurzburg "interview experiments are no experiments at all in terms of the scientific method. Rather they are sham experiments [appearing to be scientific] only in that they occur typically in the psychological laboratory and an alleged experimenter is in the presence of a subject, and that they appear to be systematic while in actuality they are not...". Wundt accused the Wurzburgers of lapsing from science into the "obsolete method ... of self-observation".

Wundt also faulted the Wurzburg psychologists for trying to draw a scientific conclusion from entirely negative results, and for mistaking logical processes of reasoning for psychological ones. The interview-experiments of Wurzburg were more like oral exams than psychological experiments, Wundt claimed; in both an examiner springs upon an examinee an unexpected problem and then questions the examinee about the answer, tending inevitably to lead the examinee toward some ideas and away from others. But the conditions of the examining room are not those of the laboratory, and as far as science goes the Wurzburgers had "observed nothing."

Wundt went on to consider other ways of investigating thinking, such as linguistic analysis, and found them all wanting. He sketched his own theory of thinking, in which thoughts emerge from into consciousness as given organized wholes. The whole ideas are then analyzed into expressible components, but this process is not thinking itself, Wundt said. Wundt offered no final solution to the problem of investigating thinking, recognizing that psychology is still "in the Kindergarten". He remained distressed, however, at the great popularity of the "terribly simple" Wurzburg method, and its American offspring, the questionnaire.

Wundt's paper seems to have had no effect at all on the imageless thought controversy in America. Titchener replicated the experiments and found no imageless thoughts, and as a result various psychologists began to distrust introspection altogether, abetting the movement under way toward behaviorism. In rejecting the interview-experiments, however, the behaviorists falsely rejected Wundt's experimental introspective psychology. It is remarkable how the Wurzburg experiments quickly became for psychologists the paradigm of introspective method and the conspicuous example of the failure of the psychology of consciousness. And the myth persists still. In the Times Literary Supplement last year, Philip Johnson-Laird depicted the Wurzburg experiments as typical of pre-behaviorist psychology, arguing that while the behaviorists went overboard, they were nevertheless correct in rejecting introspective methods. Ironically, Johnson-Laird then defended at least one form of introspection as quite scientific, namely reports of perceptions, exactly what Wundt put forward as correct introspection in 1907.

REFLECTION ON CURRENT CONTROVERSY

Introspection and consciousness in cognitive science

With the revival of cognitive psychology and the birth of cognitive science, the problem of how to investigate thinking has arisen again. Especially following the publication of Nisbett & Wilson's (1977) "On telling more than we can know" the validity of introspection as a method for revealing cognitive processes has been much in dispute. Nisbett and Wilson describe a number of experiments which purport to establish that people are unaware of the determinants of their own behavior. For example, Nisbett and Wilson

describe an experiment in which customers of a drycleaning shop were asked to evaluate which of several presented pantyhose were the most preferable. Unknown to the subjects, the pantyhose were all identical, and most subjects tended to choose the last one as the best. However, subjects never reported choosing that one because it was last, but gave reasons involving sheerness, color, texture, and other criteria that could not have actually influenced the choice of hosiery.

From such experiments Nisbett and Wilson concluded that in most circumstances "it is the result of thinking, not the process of thinking that appears spontaneously in consciousness" (quoting Miller, 1962). Their data, they conclude, is "consistent with the most pessimistic view concerning people's ability to report accurately about their cognitive processes". When subjects are asked to give accounts of their thinking, "they do not do so on the basis of any true introspection. Instead their reports are based on a priori, implicit causal theories" about behavior bearing little or no relation to the actual cognitive processes involved. Nisbett and Wilson conclude therefore that introspective reports are of no value to cognitive science and may be safely ignored. While other students of the matter differ with Nisbett and Wilson's extreme rejection of introspection, they generally do so only as a matter of degree, and no information processing psychologist takes introspection seriously as a tool for investigating thought. And like their behaviorist predecessors, they believe their rejection of introspection is a rejection of the methods of the early mentalists.

1907 and today

We would like to discuss three points raised by juxtaposing Wundt's analysis of the Wurzburg experiments with the controversies over the status of introspection and consciousness in contemporary cognitive science.

First -- and it is by now a tired truism that psychologists ignorant of the past keep repeating it -- it is clear from Wundt's discussion of the Wurzburg experiments that he was as skeptical about the possibility of introspecting thinking as any cognitive scientist. The experiments cited in support of their position by Nisbett and Wilson are quite similar to the Wurzburg experiments, with the additional flaw of using unpracticed observers who did not even know that they would be asked to report on their thought processes at the end of the experiment. As Wundt said of the Wurzburg experiments, Nisbett's and Wilson's are armchair "self-observations with obstacles." The conditions that Nisbett and Wilson describe as most favorable to introspective access to thinking come close to meeting Wundt's criteria, involving highly controlled experimental conditions, the possibility of systematic replication of conditions, and knowledgeable subjects. Finally, both Wundt and Nisbett and Wilson argue that consciousness contains the results of thought, not the process of thought itself. Quite clearly, for Nisbett and Wilson, as for Johnson-Laird, the paradigm of introspection is the interview method, once again discredited; with several generations of psychologists now, they do not know that Wundt was the first to discredit it.

Our second point is so glaringly obvious that its meaning seems to be forgotten. Cognitive scientists are what I have elsewhere called behavioralists. Their goal is the explanation of behavior. In a paper on the status of verbal reports in cognitive psychology, Ericsson and Simon (1980) explain their aim, not very different from John B. Watson's: "We would like to have processing models so explicit that they could actually produce the behavior from the information in the stimulus." For Ericsson and Simon, as for other cognitive scientists, introspective reports -- "subject behavior" Ericsson and Simon call it -- is valuable only insofar as it reveals the cognitive processes that generate behavior. The behaviorist attitude stands in great contrast to the mentalist

attitude. For the mentalist, the job of psychology was to explain conscious experience; for the behaviorist, the job of psychology is to explain behavior. Experience is at best a supplementary source of information for the cognitive scientist, not the primary data to be explained. Indeed, with the sole exception of a paper by William Brewer (Brewer & Pani, 1983), we have been able to find no paper within cognitive science maintaining that cognitive theories should even attempt to provide accounts of subjective experience.

Cognitive scientists, like other behaviorists, seem to find consciousness puzzling; certainly they have no room for it in their theories. Stevan Harnad, a thoughtful and reflective observer of cognitive science, has said this (Harnad, 1985):

... the cognitivist is as powerless as the behaviourist to observe directly what (if anything) seems to be going on in anyone's head but his own. And, more important, what cognitive theory attributes to our heads has no reason whatever for being conscious. Cognitive theory, like behaviourist "theory", will always be equally (and indistinguishably) true of an organism (or machine) that behaves exactly as if it were conscious (but is not) and an organism that is conscious. That's why it's still a kind of behaviourism."

The behaviorist, then, unlike the mentalist, feels no responsibility for accounting for human conscious experience. At best, introspection may provide the behaviorist with clues to why people act as they do, but certainly they do not care why people experience as they do.

Our third point refers back to Wundt's argument that the Wurzburgers confused logical analysis with psychology. A similar problem recurs in cognitive science's treatment of consciousness and introspection. If one closely examines the arguments of Nisbett and Wilson or Ericsson and Simon, one finds that they are at once naively trusting and aggressively skeptical about introspective reports. Wundt was deeply concerned that the reports of the Wurzburg subjects were neither accurate nor precise accounts of what transpired in consciousness during thinking. In contrast, cognitive scientists naively accept subjects' reports as accurate descriptions of their experiences; but they aggressively quite skeptical about whether introspections report the actual information processes that generate behavior, because they think that few information processes enter or affect consciousness at all.

Cognitive science has fallen prey, we believe, to a modern version of confusing logic with psychology. Cognitive science is closely allied with and influenced by work in artificial intelligence. In AI work, theorists approach a problem by analyzing it logically, analyzing tasks into component parts and then creating programs that implement the demands of the task at hand. They need not concern themselves with asking if their program mimics human performance; it is sufficient if the program or robot gets its job done. The temptation is great, however, to apply the same approach to cognitive psychology. One may take a piece of behavior and and logically analyze the information processes that "must" take place to generate the behavior, producing an allegedly psychological theory of the behavior under consideration. Then, one may design an experiment in which subjects perform the behavior in question. If one interviews subjects about what they thought during the experiment, one will be cheered if one finds that their reported thought processes are those posited by one's theory. If the interviews reveal something else, however, one can reject subjects' introspections as irrelevant, arguing, with Nisbett and Wilson, that people have "little or no direct introspective access to

higher order cognitive processes" and that introspections reflect merely folk theories about behavior. In this way, consciousness is rendered irrelevant to modern psychology by being placed in a sort of Catch 22: it is allowed to confirm a priori theories like those Wundt accused the Wurzburgers of holding, but it is not allowed to refute them.

Bringing all of this together, we find ourselves on the edge of the psychological unconscious, a concept which was controversial to Wundt and ought to be controversial to us. In his 1907 paper, Wundt recognizes that people may be influenced by things of which they are dimly aware. Nevertheless, he sarcastically described the psychological unconscious as a field for "idle speculation". The problem with the psychological unconscious, as Wundt saw, is that one may project into it any process one feels must lie behind behavior or experience. For Wundt, what was psychologically real is what is conscious, or, more precisely, what is potentially conscious under correct experimental controls. Cognitive science, however, allows itself to posit all manner of unconscious processes which it feels with the confidence of the Wurzburgers must be there, introspected or not, because logic demands it. Yet we should ask, with both Wilhelm Wundt and, surprisingly, B. F. Skinner, What is the reality of these unobservable processes? Ludwig Wittgenstein once remarked "We talk of [mental] processes and states and leave their nature undecided. Sometimes perhaps we shall know more about them -- we think. But that is just what commits us to a particular way of looking at the matter. For we have a definite concept of what it means to learn to know a process better. (The decisive moment in the conjuring trick has been made and it was the very one we thought quite innocent.)." According to Wundt, by their methods the Wurzburg psychologists put into their hat the rabbit of imageless thought, and pulled it out to great confusion and wonderment. Has cognitive science put into its hat the rabbit of information processes, and have we been uncritically dazzled by its apparently revolutionary production?

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